NC Lab 1

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Task 1

Question $3x^3 – x$

Code

```
x=s.Symbol('x')
eq = (3*x**3)-x
ans = s.diff(eq,x).evalf(subs={x:3})
print("True value ",ans)
a = 3*(3+0.3)**3-3.3
b = 3*3**3-3
eq = (a-b)/0.3
print("Approximatly value  ",eq)
print("True Error ",eq-ans)
```

Output

```
True value  80.0000000000000
Approximatly value   88.36999999999999
True Error  8.36999999999999
```

Task 2

Question Sin^2x

Code

```
x=s.Symbol('x')
eq = (s.sin(x))**2
ans = s.diff(eq,x).evalf(subs={x:3})
print("True value ",ans)
a = (s.sin(3.3))**2
b = (s.sin(3))**2
eq = (a-b)/0.3
print("Approximatly value  ",eq)
print("True Error ",eq-ans)
```

Output

```
True value  -0.279415498198926
Approximatly value   0.0829456800691174 - 3.33333333333333*sin(3)**2
True Error  0.362361178268043 - 3.33333333333333*sin(3)**2
```

Task 3

Question $2x^3 – 4x^2 + 3x + 1$

Code

```
x=s.Symbol('x')
eq = 2*x**3-4*x**2+3*x+1
ans = s.diff(eq,x).evalf(subs={x:3})
print("True value ",ans)
a = 2*3.3**3-4*3.3**2+3*3.3+1
b = 2*3**3-4*3**2+3*3+1
eq = (a-b)/0.3
print("Approximatly value  ",eq)
print("True Error ",eq-ans)
```

Output

```
True value  33.0000000000000
Approximatly value   37.379999999999995
True Error  4.38000000000000
```